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16. (Once amended) The low void pressure swing adsorption system of Claim 11, wherein distribution pipes connect said valves to said common pressure source.

RESPONSE

The specification has been amended in order to clarify the description of Figure 7. The claims have been amended to more clearly define the invention and to correct the antecedent basis issues raised by the Examiner. The limitation of claim 2 has been incorporated into claim 1. The amendment to claim 11 is supported on page 18, lines 29-31. It is respectfully submitted that no new matter has been added.

The Art Rejections:

Claims 1-6 (with claims 7-10 being canceled) have been rejected under 35 USC 102(b) as being anticiptated by Smolarek et al ('242).

This rejection is respectfully traversed as being moot. In particular, it is noted claim 1 has been amended to recite that the inlet header and outlet header have a combined volume of less than 10% (this limitation was found in original claim 2). In the '242 patent, the combination of the feed side void volume (gas feed inlet means + gas feed channel) and the product side void volume (product flow channel + product outlet means) is thirteen (10% + 3%) percent (see col. 5, lines 30-32 and 51-54). While Smolarek does not use the terms "inlet header" and "outlet header" it submitted that these terms define the same volume as that described in Smolarek in that they are the feed and product volumes within the vessel. In light of the above, the Smolarek patent does not anticipate the invention as now claimed and this rejection should be withdrawn.

The remaining claims were rejected under 35 USC 103 as being obvious over the combination of '242 with Rouge et al ('233).

It is noted that none of the cited references teach or suggest the use of **two or more** inlets coupled to the inlet header as claimed.

For the reasons above, the claims presently in the application, namely Claims 1-6 and 11-20, are believed patentable over the references of record. As the application is believed in condition for allowance, a favorable action is hereby requested.

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Should the Examiner have any questions with respect to the above, he is encouraged to contact the undersigned.

Respectfully submitted,

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SPECIFICATION AMENDMENTS

On Page 10, fourth paragraph:

Figure 7 is a graph depicting the void influence on recovery (solid line) and power (dotted line). Case A is the prior art (as shown in Figure 1) but with a fast cycle time (approximately 2 seconds), low recovery and high power. Case B is the present invention with a reduced distribution pipe void volume as shown in Figure 2b. Case C is the present invention with a flat header as shown in Figure 2d. The two-bed system has a high pressure equal to 1.5 bars and a low pressure equal to 0.3 bars, an O_2 purity equal to 90% and a cycle time equal to approximately 1 to 2 seconds.

Page 23, first paragraph:

Figure 7 illustrates the influence of the void volume on the performance of fast cycle processes. Given, for example, a conventional axial-bed PSA system (such as that shown in Figure 1) with a cycle time of about 10 seconds and a void volume of about 14%. In order to reduce cycle time to 2 seconds, the bed length must be reduced to one-fifth of its original size. Such a reduction in bed length corresponds to a void volume increase of about 70%. With such a large void volume, oxygen recovery will decrease to about 20%, as indicated by case A1 of Figure 7. Therefore, a conventional bed configuration cannot achieve fast cycle times without greatly compromising product recovery.

Page 23, paragraph two:

By contrast, using the configuration disclosed in the present invention, the distribution pipes can be avoided as in Figure 2b, resulting in a reduction of the void volume to about 50%. Such a reduction increases recovery to about 25%, as indicated by case B1 in Figure 7. Furthermore, in the present invention, if two flat headers are used as shown in Figures 2c and 2d, the void volume can be reduced to a few percent of the adsorbent bed, resulting in a recovery of more than 50%, as indicated by case C2 in Figure 4. Thus, the present invention reduces cycle time while significantly improving recovery.

In the paragraph bridging pages 23-34:

Similarly, the void volume has a very important effect on power consumption for fast cycle process because large amounts of power are generally lost in the voids. Simulations indicate that as compared with 70% void case A2, the present invention can reduce power by 16% in case B2 by eliminating the distribution void, and up to 50% in case C1 by using flat headers. It should be understood that the foregoing description is only illustrative of the invention. Various alternative and modifications can be devised by those skilled in the art without departing from the invention. Accordingly, the present invention is intended to embrace all such alternatives, modifications and variances which

fall within the scope of the appended claims. More particularly, the system, although presented here with a one or two bed embodiment, can be practiced with more beds. Further, the invention is not restricted to a single adsorbent. Multiple adsorbents can be employed. Also, adsorbents could be layered or mixed within a bed. The adsorbents should not be limited to nitrogen selective adsorbents mentioned above, other adsorbents can be employed as well. Although the process of the present invention is preferably operated near atmospheric pressures and ambient temperatures, it can be applied to a full range of process conditions, e.g., pressures, temperature, and flow rate, etc.

CLAIM AMENDMENTS

1. (once amended) A low void pressure swing adsorption system ~~wherein flow movement and pressure pulse are influenced from the same pressure source~~ comprised of:

(a) at least one hermetically sealed vessel containing an adsorbent bed with at least one inlet coupled to the adsorbent bed by way of an inlet header and at least one outlet coupled to the adsorbent bed by way of an outlet header;

(b) wherein the inlet header and the outlet header of each vessel have a combined volume of less than ~~2~~10% of the volume of the adsorbent bed of said vessel; and,

(c) wherein each inlet is coupled with at least one pressure source.

11. (Once amended) A low void pressure swing adsorption system ~~wherein flow movement and pressure pulse are influenced from the same pressure source~~ comprised of:

(a) at least one hermetically sealed vessel containing an adsorbent bed with at least two~~one~~ inlet~~s~~ coupled to the adsorbent bed by way of an inlet header and at least one outlet coupled to the adsorbent bed by way of an outlet header;

(b) wherein the inlet header and the outlet header of each vessel have a combined volume of less than 50% of the volume of the adsorbent bed of said vessel;

(c) wherein each inlet has a valve mounted proximate to said vessel; and,

(d) wherein each valve shares a common pressure source.

16. (Once amended) The low void pressure swing adsorption system of Claim 11, wherein distribution pipes connect said valves to said common ~~high~~ pressure source ~~or said low pressure sink~~.